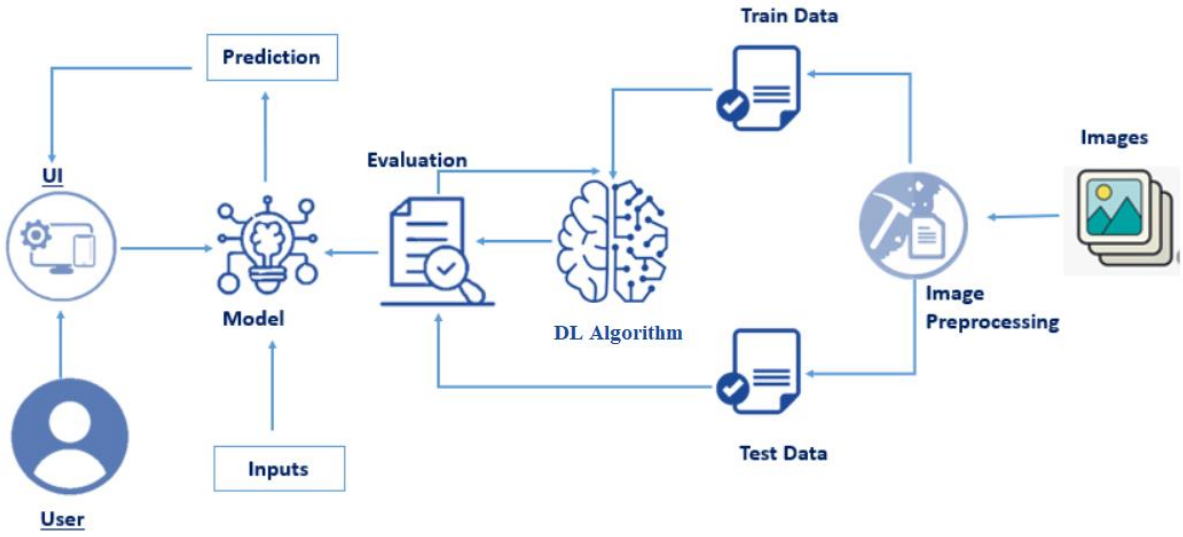
Fertilizers Recommendation System For Disease Prediction

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques.

An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

Technical Architecture



Project Objectives

By the end of this project you'll understand:

- Preprocess the images.
- Applying the CNN algorithm to the dataset.
- How deep neural networks detect the disease.
- You will be able to know how to find the accuracy of the model.
- You will be able to build web applications using the Flask framework.

Project Flow

A web Application is built where

- Farmers can interact with the portal build
- Interacts with the user interface to upload images of diseased leaf
- Our model built analyses the Disease and suggests the farmer with fertilizers are to be used

To accomplish the above task you must complete the below activities and tasks

- Download the dataset.
- Classify the dataset into train and test sets.
- Add the neural network layers.
- Load the trained images and fit the model.
- Test the model.
- Save the model and its dependencies.
- Build a Web application using a flask that integrates with the model built.

Prior Knowledge

One should have knowledge on the following Concepts :

Supervised and unsupervised learning:

Watch the below video to know about the types of machine learnings

https://youtu.be/kE5QZ8G_78c

Regression Classification and Clustering :

https://youtu.be/6za9_mh3uTE

Artificial Neural Networks:

https://youtu.be/DKSZHN7jftI

Convolution Neural Networks :

https://youtu.be/cleLMnmNMpY

Flask :

https://youtu.be/lj4I_CvBnt0

Prerequisites

To complete this project you should have the following software and packages

Anaconda Navigator :

Anaconda Navigator is a free and open-source distribution of the Python and R programming languages for data science and machine learning-related applications. It can be installed on Windows, Linux, and macOS. Conda is an open-source, cross-platform, package management system. Anaconda comes with so very nice tools like JupyterLab, Jupyter Notebook,QtConsole, Spyder, Glueviz, Orange, Rstudio, Visual Studio Code. For this project, we will be using Jupiter notebook and spyder

To install Anaconda navigator and to know how to use Jupyter Notebook a Spyder using Anaconda watch the video
https://youtu.be/5mDYijMfSzs

To build Deep learning models you must require the following packages

Tensor flow: TensorFlow is an end-to-end open-source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries, and community resources that lets researchers push the state-of-the-art in ML and developers can easily build and deploy ML powered applications.

Keras : Keras leverages various optimization techniques to make high level neural network API easier and more performant. It supports the following features:
Consistent, simple and extensible API.
Minimal structure - easy to achieve the result without any frills.
It supports multiple platforms and backends.
It is user-friendly framework that runs on both CPU and GPU.
Highly scalability of computation.
Flask: Web framework used for building Web applications
Watch the below video to Install the necessary Packages
https://youtu.be/akj3_wTploU